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ABSTRACT

The relationship between field dependence-independence (FDI) and the ability to read and comprehend printed text was examined in this study. The effect of the structure of instructional text on the learning process of individuals at various points on the continuum of FDI was also studied. The following hypotheses were developed: (1) there would be significant differences between field dependent and field independent participants in their scores on tests after reading instructional text with center and side headings or without headings; (2) field independents would score significantly higher than field dependents on tests when the text does not include headings; and (3) field dependents would score at least as well as field independents when the text contains headings. The Group Embedded Figures Test was administered to the subjects--96 students at the University of Wisconsin--Stevens Point--to classify them on the FDI variable and they were randomly assigned to two groups. One group received instructional text with center and side headings; the other group received the same text without headings. A short objective test covered the important aspects of the text. Results indicated that the headings improved scores for field dependent individuals, while field independent subjects scored higher when given the text without headings. Areas for further research are suggested and 35 references are listed. (MES)

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FIELD DEPENDENCE-INDEPENDENCE AND LEARNING FROM INSTRUCTIONAL TEXT

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Although the existence of individual differences has been documented for many years, very little is known about how these differences relate to the learning process. One variable that has received intensive study is field dependence-independence (FDI). Field dependence-independence is a continuum. An individual at one end of the continuum is governed to a large extent by the organization of the field. This individual is referred to as field dependent. On the opposite end of the continuum, the field independent individual, is characterized by an articulated cognitive style. This person analyzes and structures experiences depending upon the task at hand and is not as easily influenced by the organization of the field.

Through years of research and observation a number of characteristics of field independent and field dependent individuals have been determined. Many of those characteristics which have an impact upon learning are listed in Table 1.

Table 1
Characteristics of Field Independents and Field Dependents

Field Independents	Field Dependents
1. Impose organization on unstructured field.	1. Take organization of field as given.
2. Have a sense of separate identity and internalized values and are independent of social field.	2. Rely on others for self definition and differentiation and are attentive to social stimuli.
3. Sample fully from the nonsalient features of a concept in order to attain the relevant attributes and to form hypotheses.	3. Dominated by the most salient features of a concept in the attainment of the relevant attributes and in hypothesis formation. Can sample fully from set of features if they are in discrete form.
4. Utilize the active approach to learning, the hypothesis testing mode.	4. Utilize the passive approach to learning, the intuitive mode.
5. Learning curve is discontinuous--no significant improvement in learning a new concept until the appropriate hypothesis is found, then sudden improvement.	5. Learning curve is continuous--gradual improvement as relevant cues are sampled.

6. Use mnemonic structures and reorganize materials for more effective storage and retrieval of information.	6. Use existing organization of materials in cognitive processing.
7. Less susceptible to inference from outside influences.	7. Particularly susceptible to social influence on test of conformity and suggestibility.
8. Learn to generalize to object and design concepts more readily.	8. Less effective in generalizations from original designs to variations on basis of common components.
9. Prefer to learn general principles and acquire them more easily.	9. Prefer to learn specific information and acquires it more easily.
10. Learn more in the absence of external reward and punishment when intrinsic motivation is present.	10. Learn more under conditions of negative social reinforcement.
11. Limited reference to other's views may make field independents impervious to helpful information.	11. Have greater recourse to external sources of information in arriving at attitudes and judgments.
12. Use wholeist strategy.	12. Use partist strategy.
13. Stress has less effect on memory.	13. Stress tends to impair memory, threatening material more likely to be repressed.
14. Draw the human figure in a more articulated fashion.	14. Draw the human figure in a less articulated fashion.

Neither end of the continuum is clearly superior in concept attainment or other aspects of learning and that value judgments should not be associated with either mode. FDI is related much more closely to how people learn than to how much is learned.

Fleming and Levie (1978) pointed out that performance on a learning task is more rapid if the salient cues are relevant and less rapid if the salient cues are irrelevant to the learning task. Since field dependents tend to be dominated by salient cues, and

ignore nonsalient cues, Goodenough (1976) hypothesized that when the salient cues are relevant, field dependents would learn the material at least as easily as field independents since they (field dependents) pick out the salient cues for processing. He further suggested that field dependents might learn the material more easily under these conditions due to their reliance on salient cues. Witkin et. al., (1977) found that field dependent people are aided by materials that provide structure. The more structured the mediator, the more that field dependent person's performance was helped. This study also found that field independents are generally unaffected by additional structure and are not hindered by its presence.

Very few other studies that looked for interactions between FDI, instructional differences, and educational outcomes have been conducted. Kogan (1979) summed up his reaction to the information available on this individual difference variable by saying:

> [F]ield dependence style might prove useful in understanding students' academic choices and teacher-learner processes more broadly conceived even though there may be defects in field dependence theory itself.(p. 32).

The Study

This study was an attempt to determine if there is a relationship between field dependence-independence one specific aspect of the learning process. The specific aspect chosen for study was the ability of individuals to read and answer questions over information delivered in the form of printed text.

An attempt was also made to determine, if FDI does affect the cognitive processing of text, how the effect is manifested. Specifically, this study attempted to determine how the structure of instructional text can aid the learning process of individuals who are at various points on the continuum of FDI.

Hypotheses

Based upon the literature, the following hypotheses were developed:

1. There would be a significant difference between field dependent participants and field independent participants on scores of tests over instructional text with center and side headings and without center and side headings.

2. Field independent participants would score significantly higher than field dependent participants

on tests over instructional text when the instructional text does not contain center and side headings.

3. Field dependent participants would score at least as well as field independent participants on tests over instructional text when the instructional text contain center and side headings.

Methodology

The participants for the study were 96 students at the University of Wisconsin-Stevens Point. The group consisted of 30 males and 66 females who ranged in age from 18 to 38 years. Thirty fields of study were represented.

The Group Embedded Figures Test (GEFT) was administered to classify the participants on the FDI variable. Following this the participants were divided randomly into two groups: one half received a selection of instructional text containing key words used as center and side headings; the other half received the same instructional text minus the center and side headings. After reading the instructional text, each participant took a short objective test covering important aspects of the instructional text.

The instructional text, "Panorama by Candlelight", was taken from the February 24, 1947 issue of Time magazine. This time period was chosen so that none of the participants were likely to have had any previous detailed knowledge of the topic of the article. A news magazine was selected because the writing level is within the reading level of the participants and the writing style is informative in nature. The test over the instructional text consisted of 16 multiple choice questions and was produced by the author and pilot-tested prior to the study to establish reliability.

Results

The range of scores on the GEFT was from 0 to 18. Those scoring 0 found none of the simple figures embedded in the complex figures. Those scoring 18 found all 18 simple figures in the complex figures. The median for the test was 13.5.

The scores on the instructional text test ranged from 3 to 14. A score of 3 means that the participant answered 3 of the 16 question correctly. A score of 14 means the participant answered 14 of 16 correct.

Using Statistical Programs for the Social Sciences (SPSS), an analysis of variance was performed on the data. The participants were divided by using the median of the GEFT scores. Those scoring below the median were classified as field dependent and those

scoring above the median were classified as field independent. The form of the instructional text, with and without headings, was the other independent variable, producing a 2x2 matrix with cell sizes ranging from 23 to 25 .

Table 2
Cell Size for GEFT score x Article Version

	Without Headings	With Headings
Field Independent	24	23
Field Dependent	25	24

Because the cell sizes are not equal but are proportional to the frequencies of each factor, the analysis of variance was conducted using a hierarchical approach. The means for each of the four cells are shown in Table 3. The results of the two-way ANOVA with GEFT score and article version is shown in Table 4.

Table 3
Mean Scores for GEFT x Article Version

	Without Headings	With Headings
Field Independent	10.5	9.3
Field Dependent	8.6	9.4

Table 4
ANOVA for GEFT x Article Version

Source of Variation	Sum of Squares	DF	Mean Square	F	Sign.
Main Effects	18.94	2	9.47	1.48	.23
Version	.69	1	.69	.11	.74
GEFT	18.25	1	18.25	2.86	.09
2-way Interactions	25.32	1	24.32	3.80	.05
Version GEFT	25.32	1	24.32	3.80	.05
Explained	43.26	3	14.42	2.26	.09
Residual	588.23	92	6.39		
Total	631.49	95	6.65		

This indicates that there is a relationship between how people score on the Group Embedded Figures Test and how they score on a test over instructional text with and without center and side headings and that the hypotheses can be accepted. There was a significant difference at the .05 level using the two-way ANOVA. In addition, the differences were in the direction predicted by the author. Field independent participants did significantly better than field dependent participants when the article contained no center and side headings. Field independent participants scored lower than field dependent participants on the article test when given center and

side headings.

Those scoring above the median on the GEFT scored higher on the instructional text test than those scoring below the median on the GEFT when the instructional text did not contain center and side headings GEFT. Those scoring below the median on the GEFT scored higher on the test than those scoring above the median on the GEFT when given instructional text with center and side headings. The field dependent participants who received the version with headings and the field independent participants who received the version without the heading statistically scored the same on the test.

Conclusions

Based upon these results, it is possible to conclude that for the field dependent participants in the study, the presence of center and side headings improved their scores on the instructional text. This is consistent with the theory set forth by Goodenough (1976) that when salient cues, in this case, the center and side headings, are present, field dependent participants would learn the material as easily as field independents.

The findings for the field independents, however, are not consistent with the theory that salient clues will increase learning, put forth by Fleming and Levie (1978). The findings also run counter to the Witkin's et. al. (1977) theory that field independents ignore additional structure and are not be affected by it. In this study, field independents scored higher on the instructional text test when given the text without the headings. The apparent conflict with Fleming and Levie is possibly due to the fact that they were not looking at individual differences in developing their message design principles, but were looking at responses of people in general. In the case of the difference between the Witkin's et. al. theory and the results found here, it would seem to be indicated that this area needs continued study with a variety of groups of participants. It is possible that an imposed structure may interfere with the structure a field independent participant develops cognitively, this type of explanation is beyond the scope of this study.

The sample was drawn from students at a Midwestern university of approximately 9000 students. Although caution has to be exercised in generalizing from this population to a larger population of college students, the results of the GEFT test are similar to the norms published in the GEFT manual.

The sample used in this study had a high ratio of

females vs. males. Because gender has been linked to FDI in many previous studies, this may introduce a confounding factor.

The results indicate that for the FDI variable it does make a difference on immediate test scores whether the instructional text contains center and side headings. Although the actual difference in mean scores is small, the direction of the results is clear. Educators should begin to consider differences between individuals when presenting information in the form of instructional text. Perhaps with the isolation of other individual difference variables which influence learning, the improvement in test scores can be magnified.

Suggestions for Future Research

The results presented here suggest several areas of additional research. One logical extension of this study would be to determine if the differences found here for FDI and text version is consistent when the instructional text is presented via CRT screens. Structuring paper handouts for students individually is a cumbersome process and therefore one not likely to see widespread use. If, on the other hand, the information is presented by CRT screen, the restructuring can be incorporated into the CRT screen program and individuals can receive the version most appropriate to them.

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